

MIDDLE PLIOCENE RAILS FROM WESTERN MONGOLIA

By E.N. Kurochkin¹

ABSTRACT: The fossil remains of three new species of rails from three Middle Pliocene localities in the Ich Nuurn Töchöm of Western Mongolia are described. These include *Palaeoaramides tugarinovi* new species, *Rallus risillus* new species, and *Crex zazhigini* new species. Rails are practically absent from Ich Nuurn Töchöm today, and the presence of three species of rails in Western Mongolia during the Middle Pliocene indicates that there has been a change in the climatic and ecological conditions found there since that time.

Soviet and Mongolian paleontologists and geologists have discovered many fossil localities (Chirgis Nuur II, Chono Hariagh, Dzavchan, "point 1080 m" in Šargyn Gov' Desert, Javor I, and others) in the western part of the Mongolian People's Republic (MPR) in the Ich Nuurn Töchöm (The Great Lakes Depression) in the past few years. These workers have recovered numerous fragmentary remains of Middle Pliocene vertebrates.

The fossil localities are located on the eastern border of the Töchöm, and run in a line from north to south for almost 400 km. The vertebrate remains occur in the Middle Pliocene (Devjatkin and Zhegallo 1974) sand and aleurite sediments of the lacustrine and nearshore-lacustrine facies. These deposits are stratigraphically apportioned by Devjatkin (1970) to the Chirgis Nuur series.

The majority of the vertebrate remains from these localities are mammalian, but fossils of fish, reptiles, amphibians, and ostracods, as well as a considerable number of birds were also collected. The birds are represented by approximately 200 fragments of postcranial bones, as well as by numerous ratite egg shell fragments. The total number of birds identified from the avifauna include 55 species belonging to 11 orders and 15 families (Phalacrocoracidae, Ardeidae, Ciconiidae, Anatidae, Phasianidae, Gruidae, Ergilornithidae, Rallidae, Scolopacidae, Phalaropodidae, Pteroclididae, Strigidae, Psittacidae, Corvidae, and Turdidae). Water birds and shorebirds are predominant in the collection, and the waterfowl are most numerous, with 14 species. Part of the paleornithological material has been described previously (Kurochkin 1971, 1976), and a description of all of the material is now being prepared for publication as a monograph. The present paper contains the description of the rallid remains from three localities: "point 1080 m," located in the central region of the Šargyn Gov' Desert in the south of the Töchöm; "Chono Hariagh," located on the northern shore of the river with the same name between Chovd Dalaj Nuur and Char Nuur Lakes; and "Chirgis Nuur II," located on the northern shore of Chirgis Nuur Lake.

SYSTEMATICS

Order Ralliformes

Suborder Ralli

Family Rallidae

Subfamily Rallinae

Genus *Palaeoaramides* Lambrecht 1933

Palaeoaramides tugarinovi new species

Figures 1, 5a

HOLOTYPE: Distal end of right humerus, No. 2614-121, Collection of the Paleontological Institute of the USSR Academy of Sciences (PIN).

LOCALITY: "point 1080 m" in Šargyn Gov', the Gov' Altaj ajmak, MPR; Middle Pliocene.

DIAGNOSIS: Humerus with (1) sulcus anconeus externus shallow; (2) processus supracondylus externus well developed, forming prominent transverse step; (3) attachment of M. pronator brevis distinctly separated.

MEASUREMENTS (in mm): Greatest width of distal end 5.5; anteroposterior depth of condylus radialis 3.3; anteroposterior depth of condylus ulnaris 1.9; distance from top of facies ligamenti interni to distal edge of condylus ulnaris 3.2; least depth of distalmost portion 2.1.

ETYMOLOGY: This species is named in honor of the memory of Professor A.Y. Tugarinov.

COMPARISON: Four species of *Palaeoaramides* are known from the Lower (Aquitania) and Upper Miocene of Europe (Olson 1977). Three of these have been described and compared on the basis of tibiotarsi and tarsometatarsi, but *P. beaumontii* (Milne-Edwards 1869) was described from a humerus from the Upper Miocene (Helvetian) of France (Sansan locality in the Gers Department). Illustrations of the humerus of *P. beaumontii* are given in the Atlas by Milne-Edwards (1869-1871), as well as by Cracraft (1973) in stereophotographs. These illustrations proved to be sufficient for the determination and comparison of the rallid humerus from Šargyn Gov'.

The humerus of *P. tugarinovi* new species and *P. beau-*

¹ Paleontological Museum of the USSR Academy of Sciences, Lenin-sky Avenue, 16, 117071, Moscow, USSR.

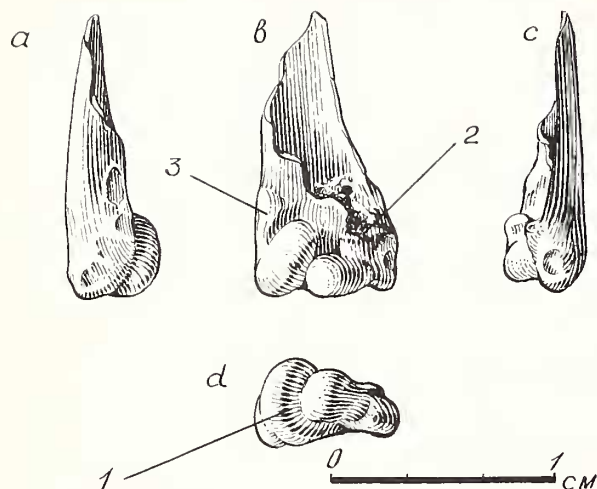


Figure 1. *Palaeoaramides tugarinovi* new species, holotype, distal end of right humerus, No. 2614-121 PIN; locality "point 1080 m," Šargyn Gov', Mongolia, in dorsal (a), palmar (b), ventral (c), and distal (d) view. 1, incisura intercondylaris; 2, processus supracondylus externus; 3, eminentia M. pronator brevis.

montii are very similar in the structure and disposition of both condyles, as well as in the structure of the epicondylus ulnaris (or processus flexoris). The latter is notably elongated distally and salient on the internal surface of the specimen. The facies ligamenti interni is similar in both. It is oval in outline, extends high externally, with its plane directed laterad and dorsad. The impression of M. brachialis inferioris also has the same outline and dimensions in both. The condylus ulnaris and epicondylus ulnaris in both species are separated by a distinct groove that is very characteristic of the genus.

Structural differences in the distal end of the humeri between *P. tugarinovi* and *P. beaumontii* were presented in the diagnosis. The sulcus anconeus externus is notably smaller in *P. tugarinovi* than in *P. beaumontii*. The processus supracondylus externus and eminentia M. pronator brevis are more

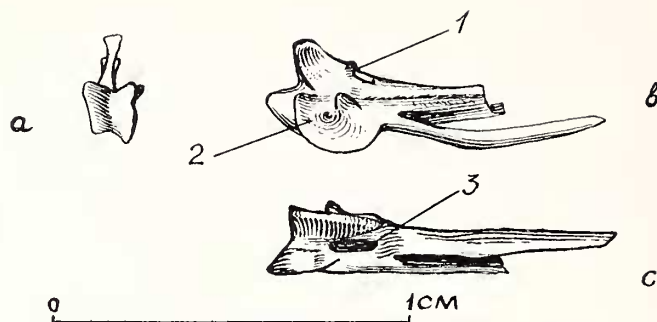


Figure 3. *Rallus visillus* new species, holotype, proximal portion of left carpometacarpus, No. 2614-100 PIN; locality "point 1080 m" in Šargyn Gov', Mongolia, in proximal (a), internal (b), and posterior (c) view. 1, facies articularis pollicis; 2, fossa carpalis interna; 3, fossa carpalis posterior.

developed in *P. tugarinovi*, as compared with *P. beaumontii*. *Palaeoaramides tugarinovi* was smaller than *P. beaumontii* (width of distal epiphysis 6.2; anteroposterior depth of the condylus radialis 3.6; anteroposterior depth of the condylus ulnaris 1.9 (from Cracraft 1973).

DISCUSSION: Cracraft (1973) pointed out the general similarity of *Palaeoaramides* and Recent *Rallus* Linnaeus. This position is confirmed with this specimen. Of all modern species of the Rallinae, *Palaeoaramides* is most similar to *Rallus*, as concluded from the general proportions of the condyles, from the outline and dimensions of the fossa olecrani, from the curvature of the distal part of the diaphysis, and from the outline of the facies ligamenti interni. But these two genera can well be distinguished by the structure of the epicondylus ulnaris, which is narrower and elongated internally in *Palaeoaramides* and weakened in *Rallus*. In *Palaeoaramides* the visible depression lies between the epicondylus ulnaris and condylus ulnaris. *Rallus* does not have such a depression, which results from the distal prolongation of the ventral edge of the condylus ulnaris. The impression of M. brachialis inferioris in *Palaeoaramides* is shallower and broader than in *Rallus*.

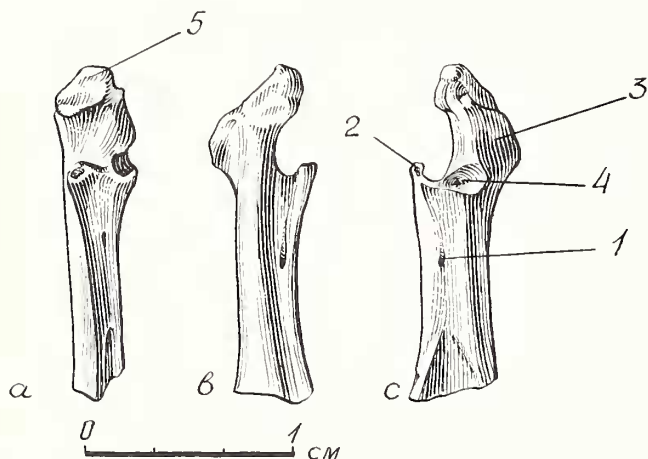


Figure 2. Cf. *Palaeoaramides tugarinovi*, referred humeral end of right coracoid, No. 3222-55 PIN; locality Chirgis Nuur II on the shore of Chirgis Nuur Lake, Mongolia, in internal (a), anterior (b), and posterior (c) view. 1, foramen supracoracoideum; 2, processus procoracoideus; 3, facies glenoidalis; 4, cotyla scapularis; 5, tuber brachialis.

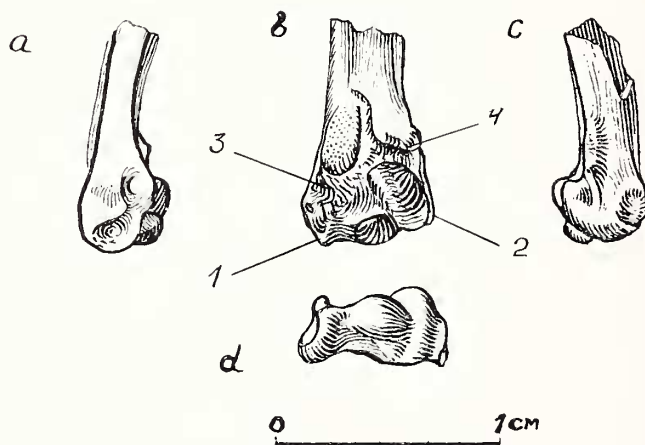


Figure 4. *Crex zashigini* new species, holotype, distal end of left humerus, No. 2614-90 PIN; locality Chono Hariagh in Chovd ajmak, Mongolia, in ventral (a), palmar (b), dorsal (c), and distal (d) view. 1, entepicondylus; 2, ectepicondylus; 3, processus supracondylus externus; 4, transversal line tuberosity.

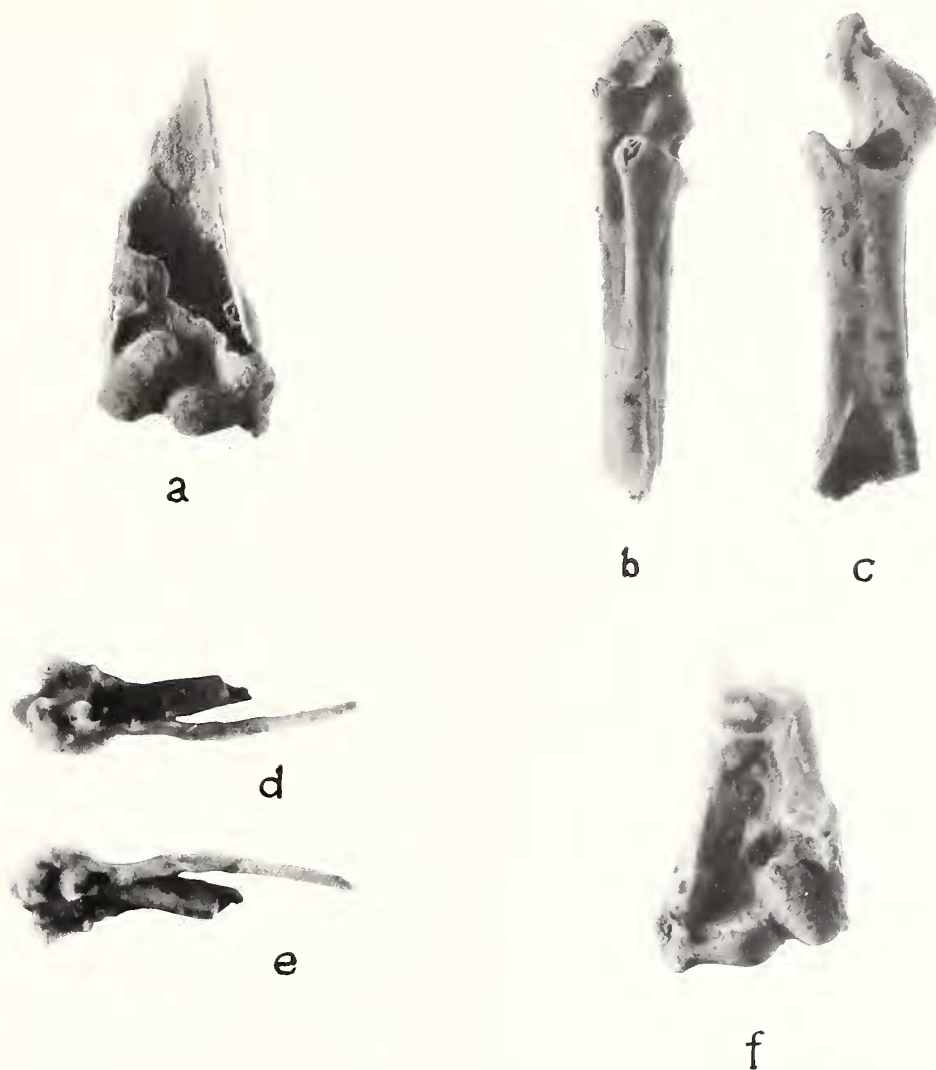


Figure 5. a. *Palaeoaramides tugarinovi* new species, holotype, No. 2614-121 PIN, palmar view; b-c. cf. *Palaeoaramides tugarinovi*, referred coracoid, No. 3222-55 PIN, in internal (b) and posterior (c) view; d-e. *Rallus risillus* new species, holotype, No. 2614-100 PIN, in internal (d) and external (e) view; f. *Crex zashigini* new species, holotype, No. 2614-90 PIN, palmar view. (all $\times 4$).

cf. *Palaeoaramides tugarinovi*

Figure 2, 5b, c

MATERIAL: Humeral end of left coracoid, No. 3222-55 (PIN).

LOCALITY: Chirgis Nuur II, MPR; Middle Pliocene.

DISCUSSION: The coracoids of the four described fossil species of *Palaeoaramides* remain unknown. The specimen here referred to *P. tugarinovi* has its most pronounced structural similarity with *Rallus*, but it still differs in certain morphological characters from that genus. The similarities include (1) the identical structure of the dorsal portion of the diaphysis, with the same localization and form for foramen supracoracoideum; (2) the same degree of development and form for processus procoracoideus; (3) the same form for cotyla scapularis; and (4) the same proportions of the acrocoracoideum. However, the details of the acrocoracoid are different: (1) The facet on the external side of the acrocoracoid is narrower and more extended in *P. tugarinovi*. (2) This is also the case with the facies glenoidalis, which is more extended distally over the

level of processus procoracoideus in *P. tugarinovi*, whereas in *Rallus aquaticus* Linnaeus the facies glenoidalis and processus procoracoideus are positioned at one transverse level. (3) The tuber brachialis in *P. tugarinovi* is smaller and more extended along the diagonal. It is more elongated internally and projects somewhat over the foramen triosseum, as compared with that of *R. aquaticus*.

This specimen is referred to *P. tugarinovi* on the basis of a unique combination of morphological characters that occur in the coracoid and humerus of modern rails. This conclusion results from similar comparisons, taking into account the appropriate relative measurements of the holotype of *P. tugarinovi* and the referred coracoid.

MEASUREMENTS (in mm): Transverse width of diaphysis 2.4; length of dorsal epiphysis (from ventral edge of cotyla scapularis) 5.6; width of facies articularis scapularis 2.4. On the basis of measurements, this specimen appears to have come from a bird between the size of *R. aquaticus* and *R. longirostris* Boddaert, being slightly closer to the former. This is also true for the holotype humerus of *P. tugarinovi*.

Rallus Linnaeus 1758
Rallus risillus new species

Figures 3, 5d-e

HOLOTYPE: Proximal end of left carpometacarpus, No. 2614-100, Collection of the Paleontological Institute of the USSR Academy of Sciences.

LOCALITY: "point 1080 m" in the central region of the Šargyn Gov' Desert, the Gov' Altaj ajmak, MPR; Middle Pliocene.

DIAGNOSIS: Carpometacarpus with (1) facies articularis pollicis appearing as small step, not sharply set off from metacarpal II; (2) fossa carpalis posterior lengthened and shallow; (3) fossa carpalis interna small; (4) anteroproximal end of trochlea radialis lying on same longitudinal axis as apophysis pisiformis; (5) size very small.

MEASUREMENTS (in mm): Transverse width of trochlea carpalis 1.5; anteroposterior width of trochlea carpalis (with processus metacarpalis I) 4.0.

ETYMOLOGY: From Latin, *risillus*, masculine, very small.

COMPARISON: The fossil rails are one of the best known groups of fossil birds (Feduccia 1968; Olson 1973, 1974, 1977). Unfortunately, no carpometacarpi of described fossil rails are available for comparison with *Rallus risillus*. We compared it with Recent *R. elegans* Audubon, *R. longirostris*, *R. aquaticus*, and *R. limicola* Vieillot. *Rallus risillus* differs from these species in the details of the carpometacarpus listed in the diagnosis. Size is a very important character of *R. risillus*, it being 1.5 times smaller than the American *R. limicola*, the smallest modern representative of the genus. Measurements (in mm) of the carpometacarpus of the four species of Recent rails are as follows. Transverse width of trochlea carpalis: *R. elegans* 3.1; *R. longirostris* 2.8; *R. aquaticus* 2.2; *R. limicola* 2.1. Anteroposterior width of trochlea carpalis (with processus metacarpalis I): *R. elegans* 7.1; *R. longirostris* 6.2; *R. aquaticus* 4.6; *R. limicola* 4.3.

In Recent *Rallus* the articulating surface of facies articularis pollicis is widened on each side, with the surface of metacarpal II sharply set off at almost a right angle to it. This contrasts with the narrow surface in *R. risillus* that is not set off from the surface of metacarpal II by a sharp angle. But a small *R. limicola* has this angle somewhat blunted. The fossa carpalis posterior, located on the interior side of trochlea radialis, is much shorter and deeper in Recent *Rallus* than in *R. risillus*. Only in *R. aquaticus* is it slightly elongated, tending toward that of *R. risillus*. The fossa carpalis interior, on the interior face of trochlea carpalis, of modern *Rallus* is deeper, larger, and farther from the apophysis pisiformis than that of *R. risillus*. In *R. risillus* the anteroproximal angle of the trochlea carpalis lies on the same longitudinal axis as the apophysis pisiformis, approximately the same position found in *R. aquaticus*. The three other species of *Rallus* have this angle shifted more caudad.

REMARKS: The comparative material of the modern Rallinae used for the description of *R. risillus* was naturally insufficient. Most of the modern tropical genera of this subfamily were not represented in the comparative series. However, I am quite certain that *R. risillus* is closest to the genera *Rallus* and *Porzana* Vieillot. *Rallus risillus* resembles *Porzana*, as indicated by comparison with *P. porzana* Linnaeus, *P. parva*

(Scopoli), *P. carolina* Linnaeus, and *P. flaviventer* (Boddaert), by having (1) the same structure of metacarpal II, which also rises gradually to the facies articularis pollicis, (2) relatively similar dimensions, and (3) the fossae carpalis posterior et interior similar in form. However, the relative dimensions of metacarpal I and metacarpal II, and their position with respect to the carpal trochlea, indicate that *R. risillus* should be referred to *Rallus*. In addition, the groove running between metacarpal I and metacarpal II begins at approximately the same position in modern *Rallus* as it does in *R. risillus*, but in *Rallus* it begins notably more proximal than in *Porzana*. The proximal articulating surface of trochlea carpalis is divided on its sides in modern *Rallus*, as in *R. risillus*, and it is relatively wider than in *Porzana*.

Crex Bechstein 1803
Crex zashigini new species

Figures 4, 5f

HOLOTYPE: Distal end of left humerus, No. 2614-90, Collection of the Paleontological Institute of the USSR Academy of Sciences.

LOCALITY: Chono Hariagh, on the northern shore of the Chono Hariagh River in Ich Nuurn Töchöm, Chovd ajmak, MPR; Middle Pliocene.

DIAGNOSIS: Humerus with (1) impression of *M. brachialis inferioris* deep and clearly outlined; (2) ectepicondylus shortened; (3) entepicondylus expanded and protruding externad; (4) processus supracondylus externus obtuse and broad; (5) transversal line tuberosity lying proximal from processus supracondylus externus extends across approximately one-third of the shaft at that point.

MEASUREMENTS (in mm): Greatest distal width 6.2; anteroposterior depth of condylus radialis 3.1; anteroposterior depth of condylus ulnaris 1.8.

COMPARISON: *Crex zashigini* closely resembles Recent *C. crex* (Linnaeus), but differs by having (1) impression of *M. brachialis inferioris* deep, with clearly marked borders (shallower, without clearly marked borders in *C. crex*); (2) entepicondylus elongated and produced (shortened and not produced in *C. crex*); (3) ectepicondylus shortened (elongated and narrow in *C. crex*); (4) processus supracondylus forming step, widened and blunted medially (pointed in *C. crex*); (5) transversal line tuberosity extending across one-third of the shaft, ending internally at impression of *M. brachialis inferioris*, and externally at edge of shaft (that tuberosity is lower and narrower in *C. crex*); (6) somewhat larger size (transverse width of distal end of humerus in *C. crex*, 5.3 to 5.5 mm). This is the first record of the genus *Crex* from Neogene deposits.

ETYMOLOGY: This species is named in honor of paleomammalogist V.S. Zashigin in recognition of his contributions to collecting of Neogene birds in Mongolia.

CONCLUSIONS

Porzana pusilla (Pallas) is the only rail inhabiting western Mongolia today. The presence of several specimens of species of the subfamily Rallinae in upper Middle Pliocene deposits of the Ich Nuurn Töchöm indicates that the ecological and climatic conditions, and the zoogeographical character, of this region may have been quite different than now. It appears

that at the end of the Middle Pliocene the climate of Western Mongolia was not as continental, with milder winters than occur there today. The lakes were probably not as salty, and their shores and the valleys of rivers and streams were covered with rich grass and bush vegetation. Additional evidence of such an environment are the large numbers of waterfowl and gallinaceous birds found in the same deposits.

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